

This Medicines Information Leaflet is produced locally to optimise the use of medicines by encouraging prescribing that is safe, clinically appropriate and cost-effective to the NHS.

Guidelines for the Management of Acute Hypocalcaemia in Adults

This document summarises the possible causes, signs and symptoms, and management of adult patients with acute hypocalcaemia. It does not address other causes of hypocalcaemia (e.g. post parathyroidectomy) or chronic hypocalcaemia, which require further investigation.

Definition

Within the OUH the reference range to define normal plasma adjusted calcium is 2.20- 2.60mmol/L.

Table 1: definition of severity hypocalcaemia

Severity of hypocalcaemia	Adjusted Calcium (mmol/L)
Mild	1.9-2.20
Severe	less than 1.9

Calcium is needed for many normal physiological functions including cardiac muscle contraction, smooth muscle contraction, coagulation and hormone secretion. The cause of hypocalcaemia should be identified and steps taken to correct it before commencing replacement therapy. This guidance is not suitable for patients with chronic hypocalcaemia, those with complex medical problems, and those with renal impairment.

Causes of hypocalcaemia

Hypocalcaemia occurs when there is a net efflux of calcium from the extracellular fluid in greater quantities than can be replaced by the intestine or bone.

Causes of acute hypocalcaemia¹

- Inadequate dietary calcium intake
- Malabsorption
- Hypomagnesaemia
- Post blood transfusion
- Acute pancreatitis
- Septic shock
- Drug induced e.g. proton pump inhibitors, some anticonvulsants, bisphosphonates, calcitonin, phosphate, foscarnet, ketoconazole,

some antineoplastic agents, colchicine (in overdose), and radio contrast dye

- Rhabdomyolysis*
- Following parathyroidectomy*
- Hypoparathyroidism*
- Pseudohypoparathyroidism*
- Malignant disease*
- Chronic renal disease*
- Vitamin D deficiency*

*Management of hypocalcaemia in these conditions is beyond the scope of this guideline-please seek specialist advice

Signs and symptoms¹

Mild hypocalcaemia is usually asymptomatic. Signs and symptoms of hypocalcaemia may include:

- Pins and needles (paraesthesia), especially of the fingers, toes and face
- Chvostek and Trousseau signs
- Muscle cramps/weakness
- Tetany
- Central nervous system involvement- irritability, anxiety, confusion and seizures
- Cardiac involvement- prolonged QT interval, QRS and ST segment changes, ventricular arrhythmia and congestive heart failure
- Hypotension
- Bronchospasm
- Laryngospasm
- Coagulation abnormalities

Treatment of Hypocalcaemia

As well as calcium replacement, management of hypocalcaemia may also include correcting/altering factors affecting calcium levels (see causes) and other electrolyte levels. Ideally, vitamin D and PTH levels should be checked^{1,2}, but don't await results before commencing treatment for hypocalcaemia. Serum magnesium levels should always be checked and corrected before commencing calcium replacement¹ - see [Hypomagnesaemia MIL](#). Isolated low levels should be re-checked, to establish validity and a trend, before supplementation is considered.

Calcium gluconate 10% w/v injection (containing 2.25mmol or 4.50mEq calcium in 10mL) is the preparation of choice within OUH for the correction of hypocalcaemia (where parenteral replacement is indicated)². Calcium chloride should NOT be used for routine replacement.

Serum Levels	Asymptomatic Mild 1.9-2.12mmol/L	Symptomatic Severe Less than 1.9mmol/L
Patient able to tolerate oral or enteral therapy	Adcal D3® (calcium carbonate 15mmol & colecalciferol 400units). 1 chewable tab twice ^{3, 4} daily. For administration via enteral feeding tube only, use Adcal D3 effervescent tablets. Contact Endocrinology if higher dose therapy deemed necessary.	Oral therapy not appropriate ²
Only IV therapy possible (e.g. NBM, not absorbing)	Monitor serum adjusted calcium regularly and treat if less than 1.9mmol/L.*	10-20mL (2.25-4.50mmol) calcium gluconate 10% undiluted by slow IV injection over 5-10minutes. If persistent, followed by: 100ml (22.5mmol) calcium gluconate 10% added to 900ml of sodium chloride 0.9% or glucose 5% infused at a maximum rate of 50ml/h ^{1, 3, 5, 8, 9} . Please contact the Endocrinology registrar on call for queries or if calcium levels are not improving.
Information for IV administration - IV bolus injections must be administered via a central line or large peripheral vein⁵ - Heart rate and ECG monitoring required during IV bolus administration⁶ - Solutions containing calcium should be administered slowly to minimise peripheral vasodilation and cardiac depression⁶ - After IV administration, serum calcium levels increase immediately and may return to normal values within 30-120 minutes⁷. Serum calcium should therefore be monitored 2 hours post injection, and every 4-6 hours⁸ if a continuous infusion is being administered.		

*Little evidence to support use of IV therapy when corrected calcium =1.9-2.20mmol/L

Adverse effects^{1, 6}

- Hypercalcaemia
- Gastrointestinal disturbances (nausea, vomiting, diarrhoea or constipation)
- Cardiac and vascular disorders (hypotension, bradycardia, arrhythmia, vasodilation, vasomotor collapse, flushing, heat sensations/sweating)
- Calcium salts are irritant; monitor for extravasation

Contraindications¹

Calcium salts should not be given to patients with the following conditions:

- Ventricular fibrillation
- Hypercalcaemia⁶
- Hypercalciuria⁶
- Those taking cardiac glycosides (may precipitate digitalis toxicity)⁶ – contraindicated with intravenous calcium only. Caution with oral calcium.

Cautions¹

Calcium salts should be used with caution in patients with renal calculi

Prepared by:

Zoe Paine, Rotational Clinical Pharmacist

With advice from:

Dr. Aparna Pal and Dr. Bahram Jafar-Mohammadi,
Consultant Endocrinologists

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